INDUSTRIAL CODE RULE NO. 8
RELATING TO

QUARRIES, OPEN-PIT MINES AND STONE CRUSHING OPERATIONS

INDEX

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Code Promulgated by the
Director of Labor
pursuant to the provisions
by
Act 161 of 1937

8-1. APPLICATION.
This code shall apply to all quarries and to all open-pit mines and to all operations directly connected therewith, to and including all stone crushing and associated processing operations involving exposure to dust containing free silicon dioxide.

8-2. SHORT TITLE.
This rule shall be known and may be cited as the "Quarrying and Stone Crushing Code."

8-3. DEFINITIONS.
8-3.1. "APPROVED" means approved by the Director of Labor.
8-3.2. "BLAST AREA" means the area included within a distance of 25 feet from the bore hole measured in all directions.
8-3.3. "BLOCKHOLING" means the drilling and blasting of boulders.
8-3.4. "DIRECTOR" means the Director of Labor of the State of Arkansas or his duly authorized representative.
8-3.5. "DEPARTMENT" means the Department of Labor of the State of Arkansas.
8-3.6. "DETONATORS" means blasting caps, electric blasting caps and delay electric blasting caps.
8-3.7. "EXPLOSIVES' means any mixture or chemical compound which is capable of producing an explosion by its own energy. This includes black powder, dynamite, nitroglycerin compounds, fulminate, or explosive substance having explosive power equal to or greater than black powder, but shall not be deemed to include any of the following:

(a) Safety fuse, consisting of a core of black powder overspun with yarns, tapes and/or waterproofing compound, and packed in outside fiberboard boxes, wooden boxes, wooden barrels, bales or metal containers;

(b) Any of the above when in their completed form and temporarily loosely stored in vented containers at the place of their manufacturer prior to packaging or after removal from their original containers of packages prior to lawful use.

8-3.8. "FLAMMABLE LIQUID" means any oil or other liquid that will generate a flammable vapor at a temperature below 100 degrees F. when tested in an open cup tester.
8-3.9. "HEREAFTER" means after the effective date of this rule.
8-3.10. "MAGAZINE" means any building or other structure other than an explosive factory used to store explosives.
8-3.11. "MINERAL" means any chemical element, compound or mixture occuring naturally as a product of inorganic processes whether metalliferous or non-metalliferous but shall not include any substance when extracted in

solution or in the fluid state through bore holes.

8-3.12. "MUDCAPPING" (sometimes known as "bulldozing," "dobying," or "plaster shooting") means the blasting of boulders by placing explosives together with a suitable detonating agent, in a compact pile on top of or against the boulder and in close contact with it.

8-3.13. "OPERATOR" means the person, firm or corporation in immediate possession of any quarry or open-pit mine and its accessories and conducting the workings thereof.

8-3.14. "PRIMARY BLASTING" means a cartridge of explosives with some means of firing it attached thereto.

8-3.15. "PRIMER" means a cartridge of explosives with some means of firing it attached thereto.

8-3.16. "QUARRY OR OPEN-PIT MINE" the term "Quarry of Open-Pit Mine" shall include open excavations, prospect openings, pits, banks and open-cut workings for the extraction of minerals, except sand, gravel and clay workings with less than five employees, and shall embrace any and all parts of the property of such quarry or open-pit mine that contribute directly or indirectly to the extraction of such minerals.

8-3.17. "STONE CRUSHING AND ASSOCIATED PROCESSING OPERATIONS" the term "Stone Crushing and Associated Operations" shall include the operations and use of all types of crushing and grinding machinery, drying equipment, screening equipment, mechanical and other separating apparatus, mixing tanks, bagging machines and other loading and packaging equipment, all conveyors, elevators, storage bins, and all other equipment and operations employed to convert the pieces of stone into the final product.

8-3.18. "SAFETY GOGGLES OR SAFETY EYEGLASSES" means those which are made with case hardened lenses.

8-3.19. "SAFETY SHOES" means shoes that have steel caps built inside the shoe to cover and protect the toes.

8-3.20. DESCRIPTIVE TERMS USED HEREIN. Such terms as "adequate", "safe", secure", "proper", "good", “sufficient”, "suitable", and derivatives thereof, in addition to their commonly understood meanings shall also mean "satisfactory to the Director."

8-4. GENERAL PROVISIONS.

8-4.1. APPOINTMENT OF SUPERINTENDENT. The operator of every quarry or open-pit mine shall appoint a superintendent who shall be personally in charge of the work and the employees therein; provided however, that nothing herein contained shall prevent an individual operator of any quarry or of any open-pit mine from personally acting as superintendent.

8-4.2. OBSERVANCE OF RULES. Every employee shall observe all rules which directly concern or affect his conduct and no person having supervision over employees shall knowingly permit nonobservance of such rules.

8-4.3. RESPONSIBILITY OF OPERATOR. The operator shall use every reasonable precaution to provide for the safety of all the employees in the quarry, open-pit mine or stone crushing operation whether provided for in these rules or not, and it shall be the duty of such operator to carry out the provisions of these rules by providing the safety devices, types of construction, materials, methods and procedures required by these rules. The term "devices" as used in this paragraph shall not be construed to include items of protective clothing. For requirements as to the latter see Rules 8-4.13., 8-4.14., and 8-9.13.

8-4.4. ACCESS TO QUARRY OR OPEN PIT-MINE. A safe means of ingress to and egress from all parts of the quarry, open-pit mine or stone crushing operation shall be provided for the safety of employees.

8-4.5. WALKWAYS OR PATHS. In all quarries or open-pit mines or stone crushing

operations, adequate walkways or paths shall be provided and maintained in a safe condition for use of employees in the performance of their duties.

8-4.6. MAINTENANCE OF EQUIPMENT. All machinery, equipment, appliance materials, structures and places shall at all times be maintained in a safe condition and in good repair.

Every employee observing any defects in or damage or injury to machinery, timbering, equipment, apparatus, materials or structures and any apparently unsafe or dangerous condition in any part of the quarry or open-pit mine or stone crushing operation shall immediately report such observation to the operator, superintendent or foreman. A record of such reports shall be maintained in the quarry or open-pit mine office until inspected by the Director.

8-4.7. REPORTS OF ACCIDENTS. Whenever an accident occurs in a quarry, open-pit mine or stone crushing operation which results in death or lost time injury, a copy of Form SE-2 containing the required information shall be sent to the Director of Labor at the close of each calendar quarter. If the accident results in death, the said Director shall be notified within 24 hours.

8-4.8. INSPECTION AND MAINTENANCE OF QUARRY OR OPENPIT MINES. The operator shall make or cause to be made frequent periodic inspections of the face and bench of the quarry or open-pit mine or stone crushing operation for loose rock, stone or other material, which shall be immediately removed.

8-4.9. REMOVAL OF WASTE MATERIAL. Waste material such as timbers and other rubbish which constitutes a hazard shall be removed from the quarry or open-pit mine or rock crushing operation, dumped in unused portions thereof or carefully burned.

8-4.10. DUST CONTROL IN DRILLING OPERATIONS. Dust control methods in rock drilling operations in a quarry or open-pit mine, shall be by any of the following: Suction or exhaust methods, wet method or other measures approved by the Director.

8-4.11. PLATFORMS, STAIRWAYS, etc. All platforms, walkways, stairways, ladders, and railings shall be securely constructed and maintained in a safe condition.

8-4.12. SAFETY SHOES. Safety shoes shall be worn by every employee whose work exposes him to foot injuries from falling objects or material; such shoes are to be furnished either by the operator or by the employer as may be agreed upon between them.

8-4.13. SAFETY HATS. Upon the direction of the superintendent safety hats, supplied by the operator, shall be worn by all employees engaged in work in those places in a quarry, open-pit mine or rock crushing operation where there is danger of being struck by falling objects or material.

8-4.14. SAFETY BELTS. Employees shall not be allowed to enter a fine-ore bin except when using a safety belt. A second employee shall be required to be on top of the gin, ready to assist the first employee to climb out of the bin in an emergency.

8-4.15. SAFETY GOGGLES OR SAFETY EYEGLASSES. Safety goggles or safety eyeglasses shall be provided by the operator of a quarry, open-pit mine or rock crushing operation and shall be worn by employees while working around the crusher and at other places upon direction of the superintendent where there is danger of being struck by flying particles of rock which is being sledged or from other flying material. Where screens are provided by the operator for the protection of employees from flying particles or material, the use of safety goggles or safety eyeglasses may be omitted while working behind the protection of such screens.

8-4.16. GUARDING OF MOVING MACHINERY AND EQUIPMENT. All drive-pulleys, gears,

belts, chains, and other moving parts of machinery and equipment shall be guarded in accordance with the provisions of Safety Code No. 1.

8-4.17. REPAIR OF EQUIPMENT. After making repairs to machinery and equipment and before the same are placed in service, they shall be restored to a safe condition and tested for safety.

8-4.18. WORK ON THE FACE OR LEDGE. Except where scaling is done with a power shovel, at least two persons shall be employed in cooperation with each other in the work of removing all loose rock. Other work at or below the blasted face shall not be resumed until the loose rock has been removed. When required by the operator, all such persons engaged in scaling operations on the face of a quarry or open-pit mine or rock crushing operation shall wear safety belts attached to life lines securely fastened to prevent falls.

8-4.19. INTOXICATING LIQUOR. No person shall, while under the influence of alcoholic beverages, enter the quarry or open-pit mine or any building connected with the operation of the same, nor shall intoxicating liquors be brought into any such places, but alcoholic stimulants may be carried into such places for the purpose of administering them to anyone injured therein.

8-5. SANITATION

8-5.1. TOILET CLOSETS. Toilet facilities, consisting of dry closets, water closets or chemical closets shall be provided by the operator for all employees on the basis of one such closet for every 25 or less employees on each shift.

8-5.2. LOCATION. Toilet facilities shall be readily accessible to all employees.

8-5.3. CLEANING AND MAINTENANCE. All toilets shall be kept in a clean and sanitary condition. If dry toilets are used, the contents shall be treated with quick lime or other equally effective disinfectants and/or deodorant. If of other than the pit type, the contents shall be periodically removed and disposed of in such manner as to maintain sanitary conditions in and about the quarry or open-pit mine or stone crusher.

8-6. WATER, WASHING FACILITIES AND FIRST AID.

8-6.1. DRINKING WATER. An ample supply of fresh drinking water shall be supplied by the operator so as to be readily accessible and available at all time. It shall be maintained clean and potable. It may be dispensed through pipe lines which shall be equipped with faucets or sanitary fountains or by means of covered containers which do not require dipping. The common drinking cup is prohibited. All water not drawn from a public water supply shall be tested and approved by the local health authority every six months.

8-6.2. WASHING FACILITIES. The operator of every quarry or open-pit mine where 10 or more are employed in direct operations shall provide a wash and change house or room readily accessible to all employees. Such wash and change house, or room shall be properly and adequately heated, lighted and, where necessary, ventilated and shall be maintained clean and sanitary at all times. Such wash and change house or room shall be equipped with lockers or other suitable means for proper protection of the employees' clothes, and adequate chairs or benches for the use of the employees. There shall be at all times in such wash and change house or room, a supply of warm water sufficient for all employees on the basis of at least one faucet for every 10 or less employees. If running water is not available, warm water shall be supplied on the basis of one pailful for every four employees. Elsewhere the provisions

of Safety Code No. 6 shall apply.

8-6.3. STRETCHERS--BLANKETS. The operators shall provide and maintain in the quarry or open-pit mine or stone crushing operations, at a place or places already accessible, a stretcher suitable for carrying injured persons, a woolen blanket and a waterproof blanket in good condition. Where 100 or more persons are employed, two or more such stretchers and blankets shall be provided and maintained.

8-6.4. FIRST-AID SUPPLIES. The operator shall provide and maintain a supply of first-aid material and equipment. Such material and equipment shall be kept in a first-aid room or place where first-aid is administered, in a dry, dust tight container. It shall be available at all time while there are employees at work and shall include the following items: Drop caps on supplies, tourniquet (in elastic), forceps or tweezers, scissors, wire or thin board splints, eye dropper, aromatic spirits of ammonia (in ampoules), sterile castor oil or mineral oil, tannic acid jelly, sterile borated petroleum jelly, tincture of iodine (in ampoules) paper cups, triangle bandage, 4" bandage with compress, 2" bandage with compress, sterile gauze compress (1 square yard), assorted sterile gauze bandages in rolls, 1" compresses on adhesive tape, ½″adhesive tape, absorbent cotton, safety pins, basin, soap, towels, first-aid handbook.

8-6.5. FIRST-AID INSTRUCTION. Every superintendent and every foreman and at least two additional persons employed in the quarry or open-pit mine or stone crushing operation designated by the superintendent, shall be instructed in and capable of administering first aid. Such instruction shall be arranged for by the operator.

8-6.6. FIRST-AID CORPS. In every quarry or open-pit mine where 50 or more are employed, a first-aid corps shall be organized and shall consist of the superintendent, all foremen, shift bosses, timekeepers and other persons designated by the superintendent.

8-6.7. CORPS MEETINGS. The first-aid corps shall meet not less than once every 12 months for instruction by a physician, or a registered nurse, or a person holding a certificate from the American Red Cross or the United States Bureau of Mines authorizing such person to administer first aid.

8-6.8. MOTOR VEHICLE FOR USE IN EMERGENCIES. Ambulance service or other facilities for transporting injured employees shall be provided or immediately available.

8-7. EXPLOSIVES, General

8-7.1. STORAGE. All magazines and all enclosures used for storage of explosives shall be kept locked at all times except while placing explosives therein or removing explosives therefrom.

8-7.2. ACCESS TO EXPLOSIVES. Only persons authorized by the superintendent shall have access to magazines or explosives storage enclosures.

8-7.3. HANDLING EXPLOSIVES--PERSONNEL. Only persons duly authorized by the superintendent shall in any way handle or use explosives.

8-7.4. SMOKING AND OPEN LIGHTS. Smoking or open lights or other flames are prohibited in an area included within a radius of 50 feet of any explosives magazine or where explosives are being handled, used or temporarily kept. This rule shall not be construed to prohibit the lighting of fuses for the purpose of blasting.

8-7.5. MARKING EXPLOSIVES. Every package of explosives shall be clearly marked so as to designate its kind and grade, the name and address of its manufacturer and the date of its manufacture. If the date of manufacture is in code, the key to such code may be obtained from the manufacturer.

8-7.6. EXPLOSIVES FOR USE. Any standard commercial explosive, except those obviously deteriorated, may be used for blasting except straight

nitroglycerin dynamite.

8-7.7. DETONATORS FOR USE. No detonator shall be used unless its initiating power, as measured in the TNT-iron oxide insensitive powder test appended here-to and made a part hereof, is at least equal to a detonator containing one gram of a mixture of 80 percent mercury fulminate and 20 percent potassium chlorate.

8-7.8. DESTROYING EXPLOSIVES. Explosives which have deteriorated, or have been damaged so that they have become unfit for use shall be destroyed by a qualified person experienced in this work and designated by the superintendent.

8-7.9. OPERATIONS DURING ELECTRICAL STORMS. All use of explosives, and any handling thereof, shall be stopped immediately upon the approach of a thunderstorm and all personnel in the area shall immediately seek a place of safety in a proper location designated by the operator.

8-7.10. MAGAZINES. All magazines hereafter constructed on the surface must, unless otherwise authorized by the Director, be located in accordance with the American Table of Distance, except that no Magazine shall be placed less than 200 feet distant from any mine opening or vital structure.

8-7.11. CONSTRUCTION OF MAGAZINES. Magazines must be fire-resistant, waterproof and bullet-resistant, except that magazines used for storage of blasting supplies do not have to be bullet-resistant. The floors of all such magazines shall be laid with sound tongue and grooved boards free from loose knots. All nails in the interior of the Magazine shall be countersunk. The ground around the Magazine for not less than 25 feet, preferably 50 feet, in all directions shall be kept free of rubbish, dead grass, shrubbery or other combustible material. Magazines shall be ventilated and the openings for ventilation shall be so screened that sparks of fire may not enter therein. Magazines shall have signs nearby printed in letters not less than 6 inches high.

8-7.12. MAINTENANCE AND REPAIRS. Magazines shall at all times be kept clean and dry. Before any alterations are made on any part thereof, all explosives shall be carefully removed and the Magazine thoroughly washed out. All discarded wooden parts shall be burned in a safe place.

8-7.13. MAGAZINES FOR DETONATORS. Detonators shall be stored in a separate magazine and no other explosives, materials or tools except a wooden wedge and a wooden mallet, shall be stored in such magazines.

8-7.14. MAGAZINES FOR ALL OTHER EXPLOSIVES. All explosives, other than detonators, shall be stored in a separate magazine devoted exclusively to such explosives.

8-7.15. STORAGE OF BLASTING ACCESSORIES. When not in use all blasting equipment and loading tools used in connection with blasting shall be stored in a separate place, compartment or enclosure devoted to such purpose, and so constructed as to keep such equipment and tools in good working condition at all times.

8-7.16. PROTECTION OF MAGAZINES. All magazines shall be so located and so protected as to prevent accidental impact from vehicles or falling object.

8-7.17. SEPARATION OF MAGAZINE. Magazines containing detonators shall not be located less than 50 feet from any magazine containing other explosives.

8-7.18. CLEANING MAGAZINES. The floor and roof of every magazine and the area surrounding it shall at all times be kept clean and free from particles of explosives.

8-7.19. ILLUMINATION. Artificial lighting of the area surrounding the magazines shall be by floodlights. No lights shall be permitted in a magazine except electric flash lights or electric lanterns, so constructed that it will not be possible to obtain a difference of potential between any

two points on the outside of the lamp casing.

8-7.20. REMOVAL OF EXPLOSIVES FROM MAGAZINES. In using explosives of any kind those that have been longest in the magazine shall be used first.

8-7.21. OPENING PACKAGES. Cases of explosives shall be opened at a distance of not less than 50 feet from any magazine. No metallic tools shall be used to open kegs or wooden cases of explosives. Metallic slitters may be used for opening fiberboard cases, provided that the metallic slitter does not come in contact with the metallic fasteners of the case.

8-7.22. WHEN TO MAKE UP PRIMERS. Primers shall be made up immediately prior to their use in the blast and the number of such primers shall not be more than is necessary for such blast.

BLASTING--General.

8-7.23. SIZE OF HOLES. All drill holes shall be of proper size so that the cartridges of explosives can be easily inserted to the bottom of the hole without forcing or ramming.

8-7.24. REMOVING CARTRIDGE WRAPPERS. Explosives shall not be removed from the original wrapper before being loaded into bore holes except when irregularities of the hole make it impossible to load whole cartridges with safety or in block holing where small charges are desirable. This rule shall not apply to free running explosives.

8-7.25. LOADING AND TAMPING. Excessive ramming shall be avoided in loading or tamping explosives in a bore hole and wooden tools only with no exposed metal parts shall be used for this purpose. In tamping, only hardwood rods without metal parts other than non-ferrous metal ferrules for extending the length thereof shall be used.

8-7.26. LOADING EXPLOSIVES--PERSONS IN FRONT OF THE FACE. No activity of a continuous nature, nor more than two men engaged in intermittent work, shall be permitted in front of a face being loaded with explosives and within the probable range of flying material in the case of a premature blast, (a) when steam equipment is being employed or (b) when primers containing electric or fuse blasting caps are employed. The probable range of flying material is a distance equal to five times the height of the face measured from the face or from the end holes of the blast, but not greater than 500 feet.

8-7.27. LOADING OF FREE RUNNING OR BULK EXPLOSIVES. When loading free running or bulk explosives a bronze, wooden, or heavy paper funnel shall be used unless the explosives can be poured directly from a container into the hole in such a manner as to prevent scattering of loose explosives around the cellar of the hole. The use of mechanical or pneumatic methods of loading shall be prohibited.

8-7.28. DETONATING-FUSE--METHOD OF FIRING. When detonating fuse is used for priming a hole, it shall be extended the full depth by lowering with the first cartridge or otherwise, immediately cut from the reel and fastened at the hole collar where it will be well in the clear from other explosives on the surface and will not interfere with loading operations. The reel shall then be moved well away or to the next hole.

8-7.29. ELECTRIC METHOD--PRIMING. When priming with electric caps, they shall be tested with a blasting galvanometer before using and the primers shall not be made up until just prior to loading into the hole. Great care shall be exercised to see that the cap is properly fastened in the cartridge and the primer seated in the charge without rough handling.

8-7.30. ELECTRIC METHOD--FIRING VOLTAGE. Blast may be fired electrically with either a power circuit or blasting machine. Such means of firing shall at all times be maintained in good operating condition. The power used shall not exceed 440 volts.

8-7.31. BLASTING CIRCUITS-TYPE. When firing with a power circuit ample capacity

shall be provided to supply the theoretical current requirements of the blast. The detonators shall be connected in straight series, straight parallel or parallel series. When firing with a blasting machine, detonators shall be connected in straight series or parallel series but never in a straight parallel. In every instance of electrical firing, regardless of source of power, the explosives manufacturer's limitations shall be observed.

8-7.32. BLASTING WIRES. Blasting circuits shall consist only of single copper conductors in good condition. The power wires and leading wires shall be thoroughly insulated and kept from contact with any electrical conductor air lines or pools of water.

8-7.33. MAKING CONNECTIONS. The leg wires of detonators shall be kept short-circuited until connected into the circuit or to the leading wires. All bare connection shall be either taped or blocked up in position so as to prevent current leakage or entrance of stray currents. While making connections in the blast area the leading wires shall be kept short-circuited at the power source end but not grounded and shall remain in the possession of the blaster. They shall then be strung from the blast area toward the source of power to make the final connections for firing the blast. Before connecting the leading wires to the power circuit, the blaster shall make certain by test that no difference in potential exists between the two wires of the blasting line.

8-7.34. FIRING SWITCH. A power circuit used for firing shall be controlled by a switch located at a safe distance to be determined by the blaster but not less than 300 feet from the blast area. Such switch when in actual use shall be firmly fastened in position, thoroughly insulated against grounds, and wholly enclosed in a tight box that shall be kept locked at all times except while firing, and no person other than the blaster shall have access to the switch. The switch shall be provided with a short circuit in the "off" position.

8-7.35. BLASTING CIRCUIT--PLUGS. When firing by means of a power circuit such circuit shall at all times be broken in at least one place by a gap of at least five feet (5) on the incoming side of the switch, except during the firing operation. The gap shall be closed during firing by means of a jumper cable and plugs which shall be stored in the locked enclosure when not in use.

8-7.36. FIRING WITH BLASTING MACHINE. When firing with a blasting machine, it shall be located at a safe distance to be determined by the blaster but not less than 300 feet from the blast area.

8-7.37. USE OF BLASTING MACHINES. When firing by means of a blasting machine, the leading wires shall be kept short-circuited until the shot is ready for firing and shall not be connected to the blasting machine until immediately before the time of firing and shall be disconnected from the blasting machine and short-circuited immediately after firing.

8-7.38. TESTING CIRCUITS. Electric detonators and blasting circuits shall be tested only by means of a blasting galvanometer designed for this purpose.

8-7.39. FUSE METHOD OF FIRING--CRIMPING CAPS ON FUSE. Only a crimping tool designed for the purpose shall be used for crimping caps on fuse. Crimping shall be performed at least 25 feet from any explosives.

8-7.40. MINIMUM LENGTH OF FUSE. A minimum length of 30 inches of fuse shall be used for firing any single charge or any device designed to be connected to multiple fuse lengths to impart ignition to them. The minimum length requirement does not apply to the multiple fuse.

8-7.41. METHOD OF LIGHTING FUSE. Fuse shall be lighted with an effective lighter and not with burning a paper or other flammable refuse.

8-7.42. WARNING AND RETREAT. Before firing any blast all means of access to the

danger zone shall be effectively guarded to exclude all unauthorized personnel. The blaster shall then sound a warning distinctly audible to all persons within the danger zone and all such persons shall retire to a safe distance or to a safe shelter. The danger zone shall then be examined by the blaster to make certain that all persons have retired therefrom to a place of safety. No blast shall be fired while any person is in the danger zone.

8-7.43. RETURN TO BLAST AREA. No person shall return from such safe distance or shelter until permitted to do so by the blaster as announced by audible or visual signal.

8-7.44. MISFIRED CHARGES. Immediately following the blast the area shall be examined by the blaster for evidence of misfired charges. If such is found, he shall provide proper safeguards for excluding all personnel from the danger zone.

8-7.45. HANDLING MISFIRES. All misfires shall be reported at once to the superintendent. He shall then determine the safe and proper method of disposal. Each misfire presents an individual problem which shall be placed under supervision of a person thoroughly competent to handle such matters. The unexploded charge shall be detonated if such can be accomplished without risk of injury to personnel. If repriming is necessary any stemming present in the hole may be removed by a jet of water or air. In case where competent supervision is not available locally, the explosives manufacturer shall be consulted for advice.

8-7.46. REOPENING HOLES. Drilling in any hole that contains or that may have contained explosives is prohibited.

8-7.47. RECORD OF MISFIRES. A complete record shall be kept at the operator's office showing all misfires and method of disposal.

8-7.48. RELOADING HOLES. In case a charge fires but does not bring down the burden, it is permissible to reload the bore hole, if in suitable condition, but only after the temperature of the hole has been reduced by water or otherwise to not more than 150 degrees F.

8-7.49. STEMMING. Each well-drilled hole shall be stemmed to the collar or to a point high enough to provide efficient confinement of the charge and to minimize the chance of injury to personnel from flying material.

Small diameter drill holes shall be fully stemmed whenever necessary to reduce the potential injury to personnel.

BLASTING—Primary.

8-7.50. ELECTRIC CIRCUITS WITHIN BLAST AREA. When loading a blast primed with electrical detonators, explosives shall not be transported into the blast area until all electric power circuits have first been disconnected to a point not less than 100 feet from blast area.

8-7.51. LOADING--OTHER OPERATIONS. When drilling and loading are being performed simultaneously in the same area, the two operations shall be separated as widely as practicable and in no case shall drilling be conducted closer to a loaded hole than a distance equal to the deepest blast hole in the area.

8-7.52. LOADING--MEASURING DEPTH OF HOLE. Holes shall be checked prior to loading to determine depth and condition. After any explosives have been loaded all measuring shall be done with a cloth tape and lead plumb bob, or a wooden tamping pole or wooden dolly free of exposed metal parts.

8-7.53. LOADING OF EXPLOSIVES--AMOUNT IN BLAST AREA.
Under no circumstances shall the amount of explosives taken into a blast area exceed the amount estimated by the blaster as necessary for the blast. Such explosives shall be stacked in piles at least 25 feet from the nearest holes being loaded or as far as the width of the bench or

floor permits, and at such distances apart that any premature explosion will not be likely to propagate from one pile to another.

The explosive containers, if any, shall be opened at the pile and carried up to the hole one case or unit at a time for immediate loading or placed at a loading station not less than six feet from the hole except that not more than 100 pounds of explosives shall be allowed at the loading station at any one time.*

*NOTE: Specific recommendations for safe spacing of piles of explosives may be obtained from the manufacturer.

8-7.54. LOADING OF EXPLOSIVES--NUMBER OF PERSONS IN BLAST AREA. Blasting operations shall be carried on with the smallest practical number of persons present and no one but authorized personnel shall be allowed in or near the blast area.

8-7.55. SPRINGING. Drill holes shall not be sprung when they are less than 100 feet from the nearest hole containing explosives.

Holes that have been sprung shall not be charged with explosives until the maximum temperature in any portion of such holes has been reduced to 150 degrees F. where practical the use of water is recommended for cooling purposes.

8-7.56. DETONATORS IN BLAST AREA--BLAST PRIMED WITH DETONATING FUSE. When loading a blast primed with detonating fuse the detonator or detonators required for firing the blast shall not be brought into the blast area not attached to the detonating fuse until all persons, except the blaster and his assistants, have been cleared from the danger zone and retreated to a safe distance or to a place of safe shelter as required by rule 8-7.42.

8-7.57. HOLES INCLUDED IN A BLAST. In any primary blasting and all other blasting where the firing of any one hole is likely to break into or damage another hole in the vicinity or where the firing of any hole may propagate the charge in a loaded hole in the vicinity, all holes which have been loaded shall be included and fired in the blast.

BLASTING--Secondary.

BLOCKHOLING AND MUD-CAPPING.

8-7.58. WORK ON THE MUCK PILE. No tools or equipment or activity of any kind shall be permitted on a muck pile directly above a blaster while he is loading explosives into block holes.

8-7.59. LOADING EXPLOSIVES WHILE DRILLING BLOCK HOLES. No person except the blaster and any other directly engaged in loading block holes shall be permitted within the immediate area while loading is being performed. Loading of any block hole shall be completed in one continuous operation including insertion of the primer and also the stemming if any is used.

8-7.60. PRECAUTIONS IN MUDCAPPING. (A) In mudcapping the mud, if any, used to cover the explosives shall be free from stones and other possible missiles. (B) The simultaneous firing of two or more mudcap shots shall be by means of electrical detonation.

8-8. **FLAMMABLE LIQUIDS**

8-8.1. STORAGE. Flammable liquids shall be stored not less than 300 feet from any explosive magazine.

8-8.2. BARRIERS. All places used for the storage of flammable liquids shall be so located or provided with barriers as to prevent its flowing to within 300 feet of any explosives magazine.

8-9. **ELECTRICAL EQUIPMENT, General.**

8-9.1. PERSONNEL AUTHORIZATION AND INSTRUCTION. No person shall install,

operate, repair, work on or with electric wires, lights, conductors or electrical apparatus, machinery or equipment, unless he shall have been previously instructed in the performance of his duties and shall have been authorized by the superintendent.

8-9.2. DISENGAGING FROM LIVE CONDUCTORS AND ELECTRIC SHOCK INSTRUCTION. Instructions acceptable to the Director for the disengaging of persons from contact with live conductors and the resuscitation of persons suffering from electric shock shall be posted in the change house or room and elsewhere as the Director may require. All employees working with the electrical apparatus shall be required by the superintendent to familiarize themselves with these instructions, and shall be capable of applying them before entering upon such work.

8-9.3. INSTALLATION AND MAINTENANCE. Every conductor and all current carrying equipment shall be so constructed, insulated, installed and maintained as to safely carry without leakage or short circuit, the voltage applied thereto.

8-9.4. SIZE OF INSULATED CONDUCTORS. The size of all insulated conductors shall be in accordance with the standards as prescribed by the National Electrical Code for insulated wires as follows:

See graph of allowable current carrying capacities of conductors in amperes on next page.

8-9.5. TRANSMISSION CONDUCTORS. Overhead transmission conductors, other than trolley conductors, carrying more than 500 volts shall not be less than 15 feet above ground throughout their length.

8-9.6. GROUNDING OF EQUIPMENT. The frames and bed plates of all motors, generators, transformers, conpensators, rheostats, and all metallic coverings of electrical conductors including the neutral wire of three or four wire systems shall be grounded.

8-9.7. CONTINUITY OF METALLIC COVERINGS FOR CONDUCTOPS. All metallic covering for conductors shall be electrically continuous.

8-9.8. BURIED CONDUCTORS. Buried conductors except ground wires shall be insulated and installed in metal or other protective covering. Such covering shall be reinforced in places where it is subject to injury.

8-9.9. CONDUCTOR JOINTS. All joints in conductors shall be secured by soldering or by mechanical means so that the joint is at least equal in conductivity to the conductor. Such joints shall be properly covered with insulation.

8-9.10. CONDUCTOR FITTINGS. The point at which conductors enter oil-filled appliances shall be provided with an oil-tight fitting. The point at which an armored conductor enters a metal housing or a metal structural member shall be provided with an insulating bushing. The point at which conductors enter a wooden housing shall be provided with an insulator The exposed ends of conductors at connection points shall be protected against moisture.

CORRECTION FACTOR FOR ROOM TEMPERATURES OVER 30° C. - 86° F.

Size AWG MCM		Rubber Type R Type RW Type RU (14-6) Thermo-plastic Type T (14-4/0) Type TW (14-4/0)	Rubber Type RH	Paper Thermo-plastic Asbestos Type TA Var-Cam Type V Asbestos Var-Cam Type AV	Asbestos Var-Cam Type AVA	Impreg-nated Asbestos Type A1 (14-S) Type A1A	Asbestos Type A (14-8) Type AA
C.	F.						
40	104	.82	.88	.90	.94	.95	...
45	113	.71	.82	.85	.90	.92	...
50	122	.58	.75	.80	.87	.89	...
55	131	.41	.67	.74	.83	.86	...
60	140	...	.58	.67	.79	.83	.91
70	158	...	.35	.52	.71	.76	.87
75	167	...	...	.43	.66	.72	.86
80	176	...	...	.30	.61	.69	.84
90	194	...	...	...	.50	.61	.80
100	212	...	...	...	...	.51	.77
120	248	...	...	...	...		.69
140	284	...	...	...	...		.59

NOTE: For four to six conductors the current carrying capacity for each conductor is reduced to 80 per cent and for seven to nine conductors to 70 per cent of the above values.

For single conductors in free air see National Electric Code.

FROM NATIONAL ELECTRICAL CODE – 1947
ALLOWABLE CURRENT CARRYING CAPACITIES
OF CONDUCTORS IN AMPERES

Not More Than Three Conductors in Raceway or Cable
(Based on Room Temperature of 30° C. - 86° F.)

Size AWG MOM	Rubber Type R Type RW Type RU (14-6) Thermo-plastic Type T (14-4/0) Type TW (14-4/0)	Rubber Type RH	Paper Thermo-plastic Asbestos Type TA Var-Cam Type V Asbestos Var-Cam Type AVB	Asbestos Var-Cam Type AVA Type AVL	Impreg-nated Asbestos Type A1 (14-8) Type A1A	Asbestos Type A (14-8) Type AA
14	15	15	25	30	30	30
12	20	20	30	35	40	40
10	30	30	40	45	50	55
8	40	45	50	60	65	70
6	55	65	70	80	85	95
4	70	85	90	105	115	120
3	80	100	105	120	130	145
2	95	115	120	135	145	165
1	110	130	140	160	170	190
0	125	150	155	190	200	225
00	145	175	185	215	230	250
000	165	200	210	245	265	285
0000	195	230	235	275	310	340
250	215	255	270	315	335	...
300	240	285	300	345	380	...
350	260	310	325	390	420	...
400	280	335	360	420	450	...
500	320	380	405	470	500	...
600	355	420	455	525	545	...
700	385	460	490	560	600	...
750	400	475	500	580	620	...
800	410	490	515	600	640	...
900	435	520	555	...	...	...
1,000	455	545	585	680	730	...
1,250	495	590	645	...	...	...
1,500	520	625	700	785	...	...
1,750	545	650	735	...	...	...
2,000	560	665	775	840	...	...

8-9.11. FUSES. All fuses shall be enclosed in a tight housing. No open type or link fuses shall be used.

8-9.12. CAPACITY OF FUSES. The capacity of fuses used to protect feeder circuits shall not exceed 125 per cent of the safe capacity of such circuit. The capacity of all fuses shall be plainly indicated thereon.

8-9.13. PROTECTION OF REPAIRMEN. Before making repairs to any electrical conductor or equipment the current shall be turned off. Where this is impractical the persons making such repairs shall use approved rubber gloves, approved shields and blankets or efficient insulating mats to be provided by the operator.

8-9.14. PROTECTION OF PERSONS OPERATING ELECTRICAL EQUIPMENT. All places where persons are required to stand while operating any switch or other control appliances having terminals exposed to contact shall be so arranged as to provide free movement of such persons, shall be maintained dry at all times and shall be provided with an insulating mat or platform.

8-9.15. PROTECTION OF EQUIPMENT. All electrical equipment, machinery and apparatus shall be installed in places sufficiently free from moisture and dust and with sufficient space to insure the safe and efficient operation and manipulation of such equipment, machinery and apparatus at all times. This rule shall not apply to transformer stations located in the open air.

8-9.16. MOUNTING FOR CONTROL EQUIPMENT. All current control and all current measuring equipment and apparatus except compensators for induction motors, and safety and magnetic switches shall be mounted on a base or bases of incombustible insulating material.

8-9.17. DANGER SIGNS. All exposed electrical machinery and equipment carrying in excess of 200 volts shall be clearly illuminated in the absence of natural light and conspicuously marked “Danger High Voltage” in white letters on red background at least three inches high.

8-9.18. FIRE FIGHTING EQUIPMENT. Approved fire extinguishers shall be installed on all electrical locomotives and electrically operated shovels.

8-9.19. LOCATION OF ELECTRICAL EQUIPMENT. All electrical machinery, equipment, apparatus and conductors shall be at least 50 feet from any explosives magazine.

MOTORS AND GENERATORS. General Provisions.

8-9.20. INDICATORS FOR GENERATORS. For each generator there shall be installed an ammeter or watt-meter. One voltmeter shall be provided to serve all generators and shall be so connected that a reading may be made for each generator separately.

8-9.21. MOTOR CONNECTIONS. All connections to motors carrying more than 200 volts shall be guarded against accidental contact therewith.

SWITCHBOARDS.

8-9.22. FRAMES. The framework used for mounting main switchboards shall be of iron or steel, or other incombustible material, and noncurrent carrying metal parts shall be grounded.

8-9.23. FLOOR MATS. Floor mats of insulating material shall be provided on both sides of every main switchboard. Such mats shall be of such size that a person cannot touch the equipment on the board while standing off the mat.

8-9.24. REAR AREAS. Access to the area back of every switchboard carrying current of over 100 volts shall be barred by means of a substantial barrier so arranged that unauthorized persons cannot enter the area or touch the equipment on the back of the panel. Entrances to such areas

shall at all times be kept locked except for the performance of work on the switchboard. Only authorized persons shall have access to such area. The gate or door lock shall be of a type which does not require the use of a key for egress from such area. Access at both ends of such area shall be provided when it is more than 30 inches in length. The depth of such area shall not be less than 36 inches measured from the electrical equipment on the back of the switchboard.

8-9.25. CONDUCTORS REAR PASSAGEWAY. Conductors crossing the rear passageway shall be at least seven feet above the floor level or shall be installed underneath the floor.

8-9.26. PROTECTION OF TERMINALS. All exposed terminals shall be protected with properly designed insulating covers of suitable material, or with metal covers connected to the ground.

8-9.27. LIGHTING. Both the front and rear of the switchboard shall be illuminated with an intensity of at least 15 foot candles.

TRANSFORMERS

8-9.28. TRANSFORMER ROOMS--WHEN TRANSFORMERS ARE LOCATED INDOORS. Transformer rooms shall be maintained well ventilated and shall be lighted so that the intensity on the floor shall not be less than 0.50 foot-candle while employees are required to be present. Such rooms shall be of fire-proof construction and shall be kept locked against the entrance of unauthorized persons.

8-9.29. TRANSFORMERS OUTDOORS. When located outdoors, transformers shall be placed on poles at least 15 feet above the ground. When this is not practicable, the transformers shall be enclosed by a fence at least six (6) feet high, which shall be kept locked against the entrance of unauthorized persons.

8-9.30. TRANSFOMER STATIONS--OPERATION OF DISCONNECTING SWITCHES. All transformer stations shall be equipped with a dry, insulated stick or equally insulated and safe method of operating disconnecting switches. Such switches shall not be operated while power is being used.

8-9.31. CURRENT INTERRUPTING DEVICES--GENERAL. All transformers shall be equipped with automatic current interrupting devices on the primary and secondary sides.

SWITCHES

8-9.32. PROTECTION. All switches other than on main switchboards referred to in Sections 8-9.22 to 8-9.27, inclusive, shall be so located or so housed as to protect them from dirt or moisture, and so as to guard persons from accidental contact with live parts thereof. All switches carrying in excess of 200 volts shall be provided with insulating mats for employees to stand on.

8-9.33. BRANCH CIRCUITS. Every branch circuit shall be provided with a switch of ample carrying capacity, on each phase, within 50 feet of the point where it leaves the main circuit.

8-9.34. INSTALLATION. Switches shall be so installed that the handle is down when the current is “off” and so that the switch cannot be closed by gravity.

8-9.35. POWER LINES--CUT-OFF. The main switch or the intermediate switches controlling current to unsupported cables, shovels and drills, shall be shut off during such hours as the quarry or open-pit mine is not operating, unless patrolled or guarded.

CABLES

8-9.36. TYPES OF CABLES. All portable cables for electrically-powered shovels, cranes, drills, machinery or equipment shall be well insulated and of

water-proof rubber-covered or armored construction.

8-9.37. INSPECTION AND REPAIR OR REPLACEMENT OF CABLES. The operator shall inspect or cause to be inspected all portable electric current carrying cables that are not carried on permanent supports, at least every other day, and shall immediately after said inspections cause all worn and damaged parts of such cables to be repaired before permitting them to be placed in service again.

All splices in such cables shall be vulcanized.

The Director shall require the replacement of any such cable or part thereof which in his opinion is so damaged or in such state of disrepair as to be hazardous to employees.

8-9.38. PROTECTION OF CABLES FROM VEHICLES. Vehicles shall not be driven over such cables unless the cables are protected against injury, the vehicles prevented from coming into direct contact with the cables and the weight of the vehicle prevented from being exerted on the cables.

Where such cables pass under tracks or roads, they shall be carried in conduits.

8-9.39. HANDLING LIVE CABLES. Power cables, which can be energized, shall be handled by authorized persons only and then only by means of adequately insulated hooks or tongs.

TROLLEY CIRCUITS

8-9.40. CONDUCTOR SPECIFICATIONS. Trolley conductors shall be of hard drawn copper and shall be not less than No. O in size.

8-9.41. SUPPORTS. Trolley conductors shall be maintained taut at all times at least eight feet above the rails.

8-9.42. BONDING. The tracks shall be bonded at every joint and crossbonded at least every 200 feet, when such tracks are used for the return circuit.

8-9.43. CIRCUIT CUT-OUTS. Trolley circuits shall be protected by sectional cut-out switches placed at regular intervals not exceeding 1,000 feet.

8-9.44. SECTIONAL SWITCHES AND FROGS. Sectional switches shall be equipped with locks and shall be locked when in open position. Every branch circuit shall be provided with a frog and a sectional switch near the frog so arranged that the branch circuit can be cut off.

8-9.45. TROLLEY CIRCUIT VOLTAGE. The voltage of trolley circuits shall not exceed 275 volts.

8-10. HAULAGE AND HANDLING EQUIPMENT—TRANSPORTATION RAILWAYS

8-10.1. ROADBED. The roadbed shall be well ballasted or blocked and maintained in a safe condition at all times.

8-10.2. WALKING ON TRACKS. All persons, except inspectors and repairmen are prohibited from walking on tracks during working hours.

8-10.3 BUMPING BLOCKS. All dead-end or elevated spur tracks shall be equipped with bumping blocks or their equivalent.

ROLLING STOCK--EQUIPMENT

8-10.4. SWITCHING LOCOMOTIVES. Switching locomotives shall be equipped at both ends with foot-boards, grab-irons, handrails and nonslip steps.

8-10.5. WARNING DEVICE. Every locomotive shall be equipped with a warning device capable of producing loud, clear warning signals.

8-10.6. BLOCKING OF CARS. Unless coupled to locomotives, cars shall be securely blocked while being loaded.

8-10.7. STOPPING AND HOLDING DEVICE. Automatic stop-blocking or derailing devices shall be provided at the top of every slope or incline greater than three (3) per cent. A holding device shall be provided for cars used on inclines. Such device shall be set in the holding position during loading.

8-10.8. CAR COUPLING. Automatic safety couplings equipped with extension handles shall be provided on all cars.

8-10.9. INSPECTION OF ROLLING STOCK. All rolling stock and the roadbed and equipment shall be periodically inspected at least once a month by experienced and competent persons authorized by the operator to do so. A written record of all defects shall be maintained in the office of the superintendent. Repairs shall be promptly made.

8-10.10. OPERATION OF LOCOMOTIVES. Every locomotive shall be operated exclusively by a competent and qualified person who shall be selected and appointed by the superintendent.

8-10.11. RIDING AND COUPLING MOVING VEHICLES. Alighting from or boarding moving vehicles or the coupling or uncoupling of moving cars is prohibited.

Riding on loaded cars is prohibited except for switching personnel.

Only authorized persons shall be permitted to ride upon a locomotive or unloaded car.

8-10.12. LOCKING OF DUMPING CARS. "Rocker" or "Cradle" type dumping cars shall be locked, except when dumping, by an efficient positive locking device.

8-10.13. TRIMMING LOADS. The material on loaded cars shall be so trimmed as to prevent the dislodging thereof during transportation.

8-10.14. HAULAGE SPEED. The maximum speed of haulage shall be determined by the superintendent but shall be subject to revision by the Director. Such speed shall be posted along the roadbed at points readily visible from the locomotive.

8-10.15. CAR COUPLING--SIGNALS. During coupling or uncoupling operations no person other than the one charged with the duty of coupling or uncoupling cars shall transmit signals to the locomotive engineman or motorman.

8-10.16. COUPLING OR UNCOUPLING OPERATION. During coupling or uncoupling operations the person performing such operation shall stand clear of the cars until they have come to rest.

8-10.17. TROLLEYS ON ELECTRIC LOCOMOTIVE. All trolleys or electric locomotives shall be trailed.

8-10.18. CAR CLEARANCE. The clearance between cars on parallel tracks shall not be less than four feet.

MOTOR TRUCKS HAULAGE

8-10.19. SAFETY OF MOTOR TRUCK DRIVER. Trucks should not be loaded by a power shovel until the truck driver is out of the cab and in a safe place, unless the truck has been specifically designed for power-shovel loading.

8-10.20. TRIMMING AND BALANCING LOADED TRUCK. The load on a motor truck shall be balanced and trimmed before the truck driver is permitted to drive away from the loading shovel. Rocks shall not be permitted to overhang or project from the sides of the motor trucks.

8-10.21. CAPACITY OF MOTOR TRUCK BRAKES. The brakes on all motor trucks shall be capable of stopping and holding such trucks when fully loaded on any grade that they will be required to negotiate.

8-10.22. INSPECTION OF MOTOR TRUCKS. Motor trucks shall be inspected daily and the brakes and steering mechanism checked by the truck driver at the beginning of the shift. Necessary repairs shall be made and motor trucks placed in safe operating condition before being placed in service.

8-10.23. RIDING IN MOTOR TRUCK CAB. No one except the driver and authorized personnel shall be permitted to ride in a motor truck cab. At no time shall there be more than three (3) people in said cab.

8-10.24. RIDING ON RUNNING BOARD OF BODY OF MOTOR TRUCK. No one shall be

permitted to ride on the running board of a motor truck, or on the body unless it is equipped to safely carry passengers.

8-11. HOISTING EQUIPMENT

8-11.1 FACTOR OF SAFETY. All rope used for hoisting by means of mechanical power shall be iron or steel wire rope. All such rope hereafter installed shall have a factor of at least five, and if used for hoisting persons, a factor of safety of at least seven.

8-11.2. SAFETY SWITCH. A safety switch or other equally efficient derail device shall be installed on all inclines and slopes.

8-11.3. DRUMS ON HOISTING ENGINES. The drums of all hoisting engines shall be equipped with flanges that will extend not less than two inches radially beyond the outer layer of rope when the rope is fully wound on the drum.

8-11.4. BRAKE AND OVERWIND. All hoisting engines shall be equipped with an efficient type of brake and an overwinding device.

8-11.5. LENGTH OF ROPE. All hoisting rope shall be of such length that at least two full turns shall at all times remain on the drum.

8-11.6. SPLICING. Wire rope shall not be spliced for the purpose of repair or increasing its length, but shall be replaced by new rope, containing no splice except to secure the ends to conveyances.

8-11.7. ROPE-WEAR. When more than 10 per cent of the original number of wires of a rope are broken within any 10 consecutive feet of length of rope or when the wires on the crown of a stand are worn to 60 per cent of their original cross-sectional area the use of the rope for hoisting purposes shall be discontinued.

8-11.8. ROPE FASTENINGS. All hoisting rope shall be securely fastened at both ends.

The winding drum end of such rope shall be secured by at least three clamps on the inside of the drum or by a tapered, babitted socket.

Wire rope shall be secured to the conveyance by means of a tapered babitted socket or a proper size pear-shaped thimble. If a thimble is used the rope shall be secured by splicing or by means of at least three rope clamps.

8-11.9. INSPECTION OF ROPES. All hoisting rope used for raising or lowering men shall be inspected once each day. A detailed inspection of such rope shall be made once each week by an experienced employee designated by the superintendent, and a written record made of such inspection and retained in the office of the quarry or open-pit mine.

8-11.10. RIDING ON CARS, BUCKETS, SKIPS. No one shall be permitted to ride on cars, buckets, skips or other conveyance operated by hoisting machinery except on regularly designated man trips.

8-12. CONTROL OF SILICA DUST IN STONE CRUSHING OPERATIONS

8-12.1. CONDUCT OF OPERATIONS. All stone crushing operations shall be so conducted that there shall be no exposure to atmospheric dust concentrations in excess of those concentrations limited by the provisions of Rule 8-12.4., "Maximum Allowable Dust Concentrations."

Wherever possible, dust generating operations shall be segregated from non-dusty operations and the number of men exposed to dust reduced to a minimum.

8-12.2. MAXIMUM ALLOWABLE DUST CONCENTRATION. The maximum allowable atmospheric dust concentration, expressed as the total number of particles of dust per cubic foot of air, shall not exceed the values given in the following table for the class of stone to be processed:

MAXIMUM ALLOWABLE DUST CONCENTRATION

Class of Stone	Free Silicon Dioxide Content of Stone	Maximum Allowable Atmospheric Dust Concentration
I	Any stone formation having free silicon dioxide as a component part and containing uniformly less than ten (10) per cent by weight of free silicon dioxide.	100,000,000 particles per cubic foot of air
II	Any stone formation having free silicon dioxide as a component part and containing ten (10) per cent or more by weight of free silicon dioxide.	100,000,000 particles per cubic foot of air

8-12.3. DETERMINATION OF FREE SILICON DIOXIDE CONTENT OF STONE. The free silicon dioxide content of stone shall be determined from composite samples representative of the material as a whole. When different kinds of stone are handled or processed separately, each shall be sampled and classified separately.

8-12.4. DETERMINATION OF ATMOSPHERIC DUST CONCENTRATION. Not less than three (3) dust samples, of at least ten (10) minutes duration, spaced at intervals to yield a fair average measurement of exposure over the entire cycle of operations shall be collected in the normal breathing zone on the premises by a standard type impinger, or other equivalent sampling instrument. The atmospheric dust concentration shall be deemed to be the average concentration as determined from the samples by the use of the light-field, low-power technic count or its equivalent.

Where, because of the nature of the operations, it is not practical to secure samples of ten (10) minutes duration, the use of any other method providing equivalent representative samples shall be permitted.

8-12.5. METHODS OF DUST CONTROL. Wherever it is required to control the concentration of atmospheric dust, such method of dust control shall be by one of, or combinations of, the following methods:

1. Local exhaust ventilation, as provided in Rule 8-13.1, "Local Exhaust Ventilation."
2. Wet method of control, as provided in Rule 8-16.1, "Wet Method of Dust Control."
3. General Ventilation, as provided in Rule 8-17.1, "General Ventilation."
4. Respirators, as provided in Rule 8-18.1, "Respiratory Protective Equipment, or
5. Any other method, or methods, approved by the Director of Labor.

Crane operators, screen attendants and other workers employed within closet cabs or observation booths whose duties do not take them away from their working stations except for short, infrequent intervals may be protected inside such cabs or booths with an adequate supply of clean air in lieu of direct dust control of the operations which they are attending, provided however, that such operations are effectively segregated so as to prevent the contamination of the rest of the plant by dust produced by such operations.

The air to the cab or booth shall be supplied from a clean outside

source and shall be supplied at a temperature at not less than fifty-five degrees (55) F. Each worker stationed in a ventilated cab or booth shall be provided with respiratory protective equipment in compliance with Rule 8-18.1, "Respiratory Protective Equipment," which protective equipment shall be worn whenever the worker is exposed to dust concentrations in excess of that permitted by Rule 8-12.1, "Maximum Allowable Dust Concentrations," in going to or leaving such ventilated cab or booth.

8-12.6. MAINTENANCE AND OPERATION. All dust control equipment shall be kept in good repair and in clean condition and shall be operated in accordance with these rules and with the conditions of approval at all times when the stone crushing processes are in operation.

The plant structure, premises, and machinery shall be kept in clean and orderly condition at all times and all waste material shall be removed at regular intervals.

8-12.7. RESPONSIBILITY OF EMPLOYEES. Every employee shall use all control measures provided for his protection and for the protection of others in accordance with the requirements of these rules.

8-13. LOCAL EXHAUST VENTILATION.

8-13.1. GENERAL REQUIREMENTS OF DESIGN AND CONSTRUCTION. Every exhaust system shall be designed and constructed in accordance with these rules and shall be installed in a substantial and workmanlike manner. Every effort shall be made to have the interior of all parts of the exhaust system smooth and free of obstructions in order to minimize resistance to air flow. All parts of the system shall be free as possible from air leakage either into or out of the system except at points where air is taken into or discharged from the system by design.

Every exhaust system shall include hoods or enclosures of suitable design located at points of dust generation and connected by means of suitable exhaust piping to air cleaning and exhaust equipment.

8-13.2. CAPACITY. The capacity of every exhaust system shall be determined upon the basis of all hoods connected to the system being open, except that where the system is so interlocked that only a part, or parts, of the system can be operated at a given time, the capacity of such interlocked system may be calculated upon the basis of those hoods, which are operative at a given time, being open.

8-14. HOODS AND ENCLOSURES.

8-14.1. DESIGNS AND CONSTRUCTION OF GOODS AND ENCLOSURES. Every exhaust hood or enclosure shall be so designed, constructed, located and placed that the air-borne dust particles will fall or be projected or drawn into the hood or enclosure in the direction of air flow, and every hood shall be so constructed as to enclose the zone of dust generation in the most complete manner consistent with the conduct of the process. Provision shall be made to eliminate or control every air movement which may tend to disperse the dust generated by the process into the general atmosphere.

Every device provided for supporting an exhaust hood or for adjusting its position with respect to the dust generating operation to which it applies shall be capable of easy adjustment and shall be substantially constructed.

8-15. EXHAUST PIPING.

8-15.1. MATERIALS AND SIZES. All exhaust piping shall be iron piping or other material of equivalent strength or suitability. Where iron piping is used the thickness shall be not less than No. 20 U.S. Standard Gauge,

but all elbows and bends shall be made from material not less than No. 18 U.S. Standard Gauge.

Flexible rubber or metal hose may be used for the connection between hoods and piping where movement of the hood is required.

8-15.2. LOCATION AND PROTECTION OF PIPING. All exhaust piping shall be so located as to require the minimum length of pipe and a minimum number of bends or elbows. Pipes shall be so located as to be readily accessible for inspection and maintenance and shall be protected against any damage due to accidental contact.

All exhaust piping shall be substantially braced and supported. All horizontal runs of pipe shall be supported at sufficiently close intervals to prevent the sagging of the pipe and all vertical runs of pipe shall be supported laterally to reduce vibration and to prevent possible movement.

8-15.3. JOINTS IN PIPING. All longitudinal joint or seams, unless of welded construction, shall be double locked or lapped and riveted with rivets centered not more than three (3) inches apart. All girth joints of pipe, except the joints of butt welded or flanged construction, shall be so made that the outlet end of one length fits into the inlet end of the next length in the direction of air flow. The length of lap shall be not less than one (1) inch. There shall be not less than four (4) rivets in any riveted girth joint.

Flanged, gasketed or bolted girth joints may be used in place of lapped and riveted joints.

Telescopic joints employed to permit the raising and lowering of hoods shall have the smaller pipe connected to the hood with a sliding fit inside the larger connecting pipe. The inside pipe shall extend into the outside pipe not less than six (6) inches when the joint is fully extended.

8-15.4. ELBOWS AND BENDS. Elbows and bends shall have a throat radius of not less than one and one half (1 1/2) times the diameter of the pipes. Rectangular elbows or bends, venturi shaped elbows or other bends of similar low-resistance design may be used in place of long radius elbows.

8-15.5. BRANCH PIPE JUNCTIONS OF MAIN LINES. Branch pipe junctions to main lines shall be made at the side or top of the main line and at an angle of not more than forty-five (45) degrees measured on the center lines of the two pipes. Not more than one (1) branch pipe shall enter the main pipe at the same point of intersection.

8-15.6. PASSAGE OF PIPING THROUGH WALLS. All piping more than eighteen (18) inches in diameter which passes through fire walls shall be provided with automatic fire doors on both sides of the wall through which it passes. Piping less than eighteen (18) inches in diameter may have, in lieu of such fire doors, fire dampers constructed of steel plate not less than three-eighths (3/8) inches in thickness.

Piping which passes through a fire partition shall be provided with an automatic fire damper of steel plate not less than No. 16 U.S.Standard Gauge for piping up to and including eighteen (18) inches in diameter; not less than No. 12. U.S. Standard Gauge for piping up to and including thirty-six (36) inches in diameter; and not less than No. 7. U.S. Standard Gauge for piping more than thirty-six (36) inches in diameter.

Approved fire dampers of other material equivalent in protection and suitability may be used in lieu of steel dampers as herein provided.

Fire doors and fire dampers for piping shall be arranged to close automatically and to remain tightly closed upon the operation of a

fusible link or other approved heat-actuated device located so as to be readily responsive to an abnormal rise to temperature in the piping. Hinged dampers shall be equipped with spring catches and hinge pins of corrosion-resistant material.

8-15.7. DAMPERS AND GATES. Except as provided in Rule 8-15.6., "Passage of Piping Through Walls," the use of dampers, gates and orifice plates shall not be permitted in an exhaust system unless provided for the specific purpose of balancing the air flow in the system, after which function they shall be riveted or permanently fixed to prevent any further manipulation.

8-15.8. CLEAN-OUT OPENINGS. Clean-out openings shall be provided in all horizontal runs of pipe wherever dust settlement is likely to occur and shall be provided at the bottom of all long vertical runs of pipe. Clean-out openings shall be provided with removable caps of such size as will permit ready access into the interior of the pipe. Unless impractical, clean-out openings shall be located on the undersides of pipes and shall offer no obstruction on the inside of the pipe.

8-15.9. CHIP TRAPS. Chip traps may be installed in the exhaust pipe to collect any large particles of dust. The materials to be collected in any chip trap shall discharge into an enclosed container which shall be readily removable for the disposal of accumulated material.

8-15.10. AIR CLEANING EQUIPMENT. Air cleaning equipment to clean the air effectively before it is discharged from the exhaust system shall be provided to prevent the contamination of any working area caused by dust released by the exhaust discharge.

The capacity and operating characteristics of all air cleaning equipment shall be such as to insure its continued operation without imparing the efficiency of the exhaust system.

Means shall be provided for the removal and disposal of collected materials at regular intervals. The removal and disposal of collected material shall be so conducted as to prevent the dissemination of dust in any working area.

8-15.11. EXHAUST FAN. Every exhaust fan shall wherever possible be located beyond the air cleaning equipment so as to handle clean air. The fan speed shall be sufficient to create the required rate of air flow when operating against the total resistance pressure of the exhaust system.

8-15.12. EXHAUST DISCHARGE. The discharge from every exhaust system shall be to the outer air. The actual point of discharge shall be so located as to prevent, as far as possible, the recirculation of dust-laden air to any working area by way of open windows or other ventilation inlets.

8-15.13. WEATHER PROTECTION Air discharge pipes and other exterior equipment shall be protected from the elements unless such discharge pipes or equipment are of such design and construction that no loss in efficiency results from exposure.

8-16. WET METHOD OF DUST CONTROL

8-16.1. GENERAL REQUIREMENTS OF DESIGN AND CONSTRUCTION. The wet method of dust control shall include an adequate and continuous supply of water delivered to the process and terminating in suitable water sprays or jets at the point of dust generation.

Water used for dust control purposes shall not be cross connected with the drinking water supply and suitable provision shall be made from the removal of water and sludge which drain from the operation.

8-16.2. PROTECTION OF WORKMEN. The wet method of dust control shall include and provide effective wetting at the point of dust generation with as little exposure of the operator to the water as possible. Effective baffles shall be installed, or protective clothing furnished by the

employer where necessary to prevent the wetting of the operator. The application of water shall be so controlled as not to create a slipping hazard.

8-17. GENERAL VENTILATION.

8-17.1. LIMITATION OF USE. General ventilation shall not be employed as the principal method of dust control, except where the stone to be processed contains less than ten (10) per cent by weight of free silicon dioxide or where the operations are such as not to require the constant attendance and exposure of the operator, and where such operations are carried on in the open air or under a simple roof.

General Ventilation shall be supplied in sufficient quantities to limit the dust concentrations to that required by Rule 8-12.2, "Maximum Allowable Dust Concentration."

8-17.2. GENERAL REQUIREMENTS OF DESIGN AND CONSTRUCTION. Facilities for general ventilation in buildings shall include mechanical ventilators of suitable capacity and construction, properly located with reference to the dust sources and such fresh air inlets as may be necessary to insure efficient circulation of air through the building.

8-18. RESPIRATORY PROTECTIVE EQUIPMENT.

8-18.1. LIMITATION OF USE. Respiratory protective equipment shall not be employed as the principal means of protecting workers against dust except in connection with isolated or infrequent operations.

8-18.2. APPROVAL OF RESPIRATORY PROTECTIVE DEVICES AND EQUIPMENT. All personal protective devices and equipment shall be approved by the Director of Labor.

8-18.3. USE AND MAINTENANCE OF EQUIPMENT. The employer shall provide each workman requiring the use of personal respiratory protective equipment with not less than one (1) such device suitably identified, and the employer shall further provide and employ facilities for the inspection, cleaning, sterilizing and repair of all such respiratory protective equipment as may be required by the standards prescribed by the Director of Labor in his approval of such respiratory protective devices and equipment. Personal respiratory protective equipment, when not in use, shall be stored in a clean, dust-proof container.

8-19. VARIATIONS

8-19.1 VARIATIONS. "If there shall be practical difficulties or unnecessary hardships in carrying out provisions of this Code or a rule of the Director of Labor thereunder affecting the construction or alteration of buildings, exits therefrom, the installation of fixtures and apparatus or the safeguarding of machinery and prevention of accidents, the Director of Labor may make a variation from such requirements. The provision or rule shall be observed and public safety secured. Any person affected by such provision or rule, or his agent, may petition the Director of Labor for such variation stating the grounds therefore. The Director shall fix a day for a hearing on such petition and give notice thereof to the petitioner. If the Director shall permit such variation it shall be in accordance with the existing laws of this State, and the variation shall apply to all buildings, installations or conditions where the facts are substantially the same as those stated in the petition, and shall be continuing as long as conditions remain unchanged."